

Impact of Materials Management on Project Success in Construction Industry

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Abstract

Materials management is a problem when there is shortage, delay in supply, damage and wastages. This research is all about how materials are managed during construction, its impact in the project success of Construction Companies, how successful a project can be when there is effective use of the materials. A literature review on materials management and project success in the contraction projects was conducted. It tells the need for more refined materials management solutions in order to improve in project success. Therefore, this study identifies the factors of importance and analyses using multi-linear regression analysis. Facts about this research were gotten over a survey by administering questionnaires. It shows how important and effective materials management is in the project success of any company.

Keywords: Material Management, Project Success, Construction Industry

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1. Introduction

To manage materials is to achieve the life of an organization. No construction company can survive without suitable management of materials. Any founding that is set up to produce one thing or another, any organization could either be goods producer or services delivery or both, and they must make use of materials in all their actions, and these materials must be properly managed to achieve the wanted objectives. In management we know that for a company to achieve their goal there must be efficient and effective use of planning, organizing, controlling and directing therefore for the effect of materials to come out successfully, the company should plan how to achieve their production procurement supply schedules materials receive, handling transportation and warehousing (Sarkis, Meade &, Presley, 2012). Construction materials form a major share of the total cost in a construction project. It has been keening out that the construction materials can constitute 50 per cent of the project cost. Owing to its part and major helping in construction projects, materials management has developed a grave factor and a serious function that advances output in construction projects. Thus, it is crucial for construction companies to know the effects of proper materials management towards the success of project performance (Schieg, 2009).

Thus, good organizing helps the management correlate and integrate the efforts of other so as to attain their goals. Through organizing the goals of the organization are given a structure and the structure aids, in planning process and success. In addition to this control gauges the success of other areas in their attempt to accomplish the performance of every worker is measured in contradiction of the piece of every worker is measured against the plan put in place by man agreement (Schwarz, Beloff & Beaver, 2002).). For instance, scheduling makes product control possible because report and monitor or workers absenteeism, time availability of material and machines a available etc could make product control possible poor production lead to poor acquiring management insufficient maintenance which disturb the company productivity (Sears, Sears & Clough 2008). It is questionable whether an organization makes use of effective planning, organizing, controlling and coordinating or of the different material at their disposal before adequately implementing them in order to achieve desired results and the different banners experienced in the process of importing and transporting material purchased by the purchasing managers and the negative impacts of ineffective management of materials in an organization (Shenhar & Dvir, 2007). Project success can be dignified before, during and after project conclusion. Project success can be defined as achieving project objectives within schedule and within budget, to satisfy the stakeholder and learns from experience.

1.2 Statement of the Problem

As a current termination from improper material management and operation where organizational efficiency are based on the life wire and the total margin output of any organization is based on how active are the materials managed and used. But the reverse has been the case, as the materials acquired by many establishments are not carefully managed in order to achieve the intended objectives of an organization.

This research therefore was inspired by these hydra-headed problems with respect to measuring the impact of materials management on organizational productivity. Management of materials have over the years have been a countless problem to most organizations in production. In project operations, there is always a bent of

mishandling of materials by organizations. As the scope of production rises, so do the scale of activities concerning materials management. On the small organizations, materials are achieved by persons with little or no knowledge about the management of materials. It is therefore, judicious for organizations to have a serious look on materials management, since it has a splitting effect on construction project (Ada & gold, 2002).

1.3 Objective of Study

The purpose of this research are as follows:

- i. To examine whether material management has an impact on project success.
- ii. To ascertain effectiveness of material management on project success

1.4 Research Hypotheses

The research hypotheses are as follow

H₁: There is a relationship between the effective management of materials and project success

H₂: Organizations make effective use of planning organizing controlling and coordinating material management before implementing them.

2. Conceptual Framework on Project Success

Project management has grown greatly over the last few years, with scholars and experts alike indicating keen interest in the field. It offers organizations the means to effective, real and competitive in a shifting, complex and random environment. It is a professional and scientific knowledge that differs from traditional management by the generally limited, temporary, innovative, unique and multidisciplinary nature of projects – it is widely recognized that project management requires its own tools and technique (Singh, Murty, Gupta & Dikshit, 2012).

It would be simple to speak of project management as a group of specific tools and techniques that one simply must apply toward the achievement of specific management objectives. Surely, it is right that project planning problems as well as planning methods such as program evaluation and review technique (PERT) and critical path method (CPM) have distant agents and experts for decades. These people have shared a deep belief that the development of better scheduling techniques would lead to better project management and thus, project success (Standish Group International, 2003).

Today, as in the past, skilled project managers are all too aware with many cases of projects that are considered failures. Without entering a complete discussion and listing failed projects, it can be said that, from a professional point of view, it is important to understand success and failure of projects. It is no top-secret that project managers remain to be high, in their training, according to the effects of projects they accomplish and that their jobs and the achievement of their organizations is subject to the routine in these projects. From a scientific perspective, project success certainly remains a central concern and much has been written and thought about this specific issue (Taylor, 1911). Given the specific uncertainty surrounding project success, this issue presents significant problems for investigators. As the proverb says, “Success is one of the names of God.” This bit of wisdom is particularly germane: if studies of project success are popular, they have not led to an agreement on, a meaning of, nor a means for assessing such success. The second problem stops from the fact that project success is reliant on one’s insight and view. These tips to conclude that there is maybe no such thing as “complete success” in project management: there is only the “apparent success of a project.” They also point out that how we elevate success probably changes over time (El-Haram & Emmanuel, 2011).

Project success has evaded the construction industry to the point where keeping existing clients has become a battle, let alone attracting new clients. An assumption is made that, if a project is completed on time, in the agreed budget and set qualify, referred to as the “golden triangle”, then the project is believed successful. Evidence suggests that this is far from the truth. Hence, the construction industry needs to pay special attention to critical success factors, besides the ‘golden triangle’, if it is to survive the challenges posed by globalization (Turner, & Muller 2005).

Projects are difficult, one-time practices- A project rise for a precise drive or to meet a definite goal. They are complex because they typically require the co-ordinate inputs of several members of the organization, project members may be from different sections or other organizational unit or from one functional area. On the other hand, some projects such as new product introductions, work best with representatives from many functions, including marketing, engineering, production and design. Because a project is planned to achieve a specified goal, it is temporary. It exists only until its goal has been met, and at that point, it is softened. Projects are limited by budget, schedule and resources. Project work needs that members work with limited financial and human resources for a stated time period. They do not run forever. Once the assignment is completed, the project team separates. Projects are established to resolve a clear goal or set goals. There is no such thing as a project team with an on-going, nonspecific purpose. Its goals, or deliverables, define the nature of the project and that is its team. Projects are intended to yield a concrete result, either as a new product or service. Whether the goal is to build a new bridge, tool a new account receivable system or win a presidential election, the goal must be specific and the project

organized to achieve a stated aim (Valdes-Vasquez & Klotz 2013)

Projects are customer focused, whether the project is answering to the needs of an internal organizational unit (e.g. accounting) or intended to exploit a market opportunity external to the organization the purpose of any project is to satisfy customer needs. In the past, this goal was sometimes ignored. Projects were measured successful if they attained technical, financial or scheduling goals. Many more, companies have understood that the main purpose of a project is customer fulfillment. If that goal is abandoned, a firm runs the risk of “doing the incorrect things well” chasing projects that may be done professionally but ignore customer needs or fail commercially (Welsch, 2005)

Therefore, project is not determined by the amount of money involved or its size. For example, the construction of a house, relocation of an office, introducing a new business, installing new facilities for education or health are all projects because they are unique, have well-defined objectives and constrained by a time factor in a broad sense. I believe a project is a specific and finite task to be accomplished at a given time (Wilkins, 2003)

2 Impact of Materials Management in Construction

Materials management is defined by Business Roundtable in Modern Management System as ‘the planning and controlling of all essential efforts to confirm that the correct quality and quantity of materials and equipment are properly stated in an appropriate manner and gotten at a sensible cost and are offered when needed’. However, some defined it in a straight line with an idea that complex adding process whereby all findings of materials are combined under one management function. Briefly, materials management can be defined as a strategic process that entail of identifying, purchasing, delivering, handling, giving of space and reducing wastes with the purpose of positive suitability of enough quantities of material for project needs. Materials management in a construction project consists of seven combined processes and functions. They include project planning, materials take-off, supplier’s enquiry, purchasing, materials control, warehousing, expediting and shipping (Zhang, Zuo, & Zillante 2013).

The construction industry is vital since rapid economic development has increased the demand for construction of infrastructure and facilities around the globe. The construction industry also provides the basic living conditions for the sustainability and development of human life on the earth. To cope with an ever-increasing population, pressure on land, and growing economic activity, construction projects are in increasing demand and activities are booming in many countries]. More also, projects and initiatives are implemented to ensure supportable growth of nation economy and to create extensive linkages within the economy. To carry out these projects positively and to meet the useful aim of the projects in their service time, an effective PM practice has to be adopted from the planning stage to the end (Welsch, 2005).

Notwithstanding the site of the materials, very little research has been focused towards accepting the management of materials from order to production; most research is attentive upon the management of the design and winning process and on labor site output. Materials management, which includes gaining, shop fabrications,

logistics, supply chain management, production on site, and field serving, requires special attention to achieve cost reduction (Zhang, Zuo, & Zillante 2013).

The aim of this is to ensure that there are enough resources when undergoing a construction is to make sure that everything is in place and to avoid project failure. So, usage of efficient materials and avoidance of wastage, extravagance is very important and will bring about a project success.

3. Research Method

This Research Therefore Covers one selected organisation in Abuja, namely Arab Construction firm, Abuja. Secondary data were attained through books, journals, and internet. Empirical works of other scholars were consulted. A sample size of 103 was obtained from the population of 140 at 5% error tolerance and 95% degree of freedom using Yamane’s statistical formula $103(100\%)$ of the questionnaires distributed 90(87.3%) were returned and 10(12.7%) were not returned. The questionnaire was designed in Likert scale format. The researchers directed a pre-test on the questionnaire to guarantee the validity of the instrument. Pearson moment product co-efficient and regression analysis were used to test the hypotheses

3.1 Test of Hypotheses

Hypothesis one

H₁: There is a relationship between the effective management of materials and project success.

H₀: There is no relationship between the effective management of materials and project success

Table I: Table of correlation between effective material management and project success

		effective material management	Project success
Effective material management	Pearson Correlation	1	.536 **
	Sig. (2-tailed)		.000
	N	200	240
Project success	Pearson Correlation	.536 **	1
	Sig. (2-tailed)	.000	
	N	240	200

** . Correlation is significant at the 0.01 level (2-tailed).

According to above calculations it is observed that amount of correlation coefficient between level of project success and effective material management is equal to 53.6 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between effective construction industry and project success. This implies that one percent increase in effective material management will lead to 53.6% increase in level of project success.

Table II: Regression analysis test of level of material management and project success

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.965 ^a	.716	.586	3.79952

a. Predictors: (Constant), effective material management

Regression coefficient of R = .965 or 96.5% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination $R^2 = 0.716$ which show that 71.6% of variation in level of project success explained by effective material management. The adjusted R-square in the table shows that the dependent variable, (level of project success) is affected by 58.6% by independent variable (effective material management). It shows that effective material management is responsible for project success in construction industry.

Table III: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant) effective material management	12.310	.901		13.656	.002
	1.056	.085	.536	12.426	.000

a. Dependent Variable: level of project success.

The coefficient of determination for effective material management is positive (1.056) and is highly significant (0.001) in ensuring level of construction industry. The p-value of 0.000 is less than the t-statistic value of 12.426 and the standard error value of 0.085. This implies that a unit increase in effective material management will lead to 1.056 increases in level of construction industry. Therefore, the null hypothesis is rejected and alternative hypothesis accepted that there is a relationship between the effective management of materials and the level of project success in construction industry.

Hypothesis two

H₂ Organizations make effective use of planning organizing controlling and coordinating material management before implementing the • m..

H₀ Organizations did not make effective use of planning organizing controlling and coordinating material management before implementing them.

Table IV: Table of correlation between effective planning, organizing, controlling, coordinating and material management

	Material management	Effective planning, organizing controlling
Pearson Correlation	1	.473**
Material management Sig. (2-tailed)		.000
N	200	250
Pearson Correlation	.473 **	1
Effective planning, organizing controlling, coordinating Sig. (2-tailed)		.000
N	250	200

** . Correlation is significant at the 0.01 level (2-tailed).

According to above calculations is observed that amount of correlation coefficient between Effective planning, organizing controlling and improving in the material management is equal to 47.3 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between Effective planning, organizing controlling and improving in the organisation. This implies that one percent increase in effective planning; organizing controlling will lead to 47.3% increase in improving in the organisation.

Table V: Regression analysis test of Effective planning, organizing controlling and improving in the organisation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773 ^a	.624	.722	3.96426

a. Predictors: (Constant), material management

Regression coefficient of $R = .773$ or 77.3% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination $R^2 = 0.624$ which show that 62.4% of variation in improving the material management is explained by information technology. The adjusted R-square in the table shows that the dependent variable, (improving the material management) is affected by 72.2% by independent variable (project success). It shows that there are positive impacts of project success on improving the material management management.

Table VI: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1(Constant)	15.036	.806		18.644	.000
Material management	1.319	.125	.473	10.520	.000

a. Dependent Variable: improving the material management

The coefficient of determination for project success is positive (1.319) and is highly significant (0.000) in improving in the material management. The p-value of 0.000 is less than the t-statistic value of 10.520 and the standard error value of 0.125. This implies that a unit increase in material management will lead to 1.319 increases in improving in the project process. Therefore, the null hypothesis is rejected and alternative hypothesis that there are positive impacts of material management on improving in the project success.

4. Conclusion

Therefore, to reduce cases of inadequate materials when working on a project, be it on construction or any other thing. Productivity construction projects are the result of a positive blend of labor, material and equipment management. Too often contractors concentrate entirely on labor or cost fall and oversee the chance for development by applying material management strategies. For a project to be successful, there has to be sufficient materials for it, materials should be allocated to the right people. They should focus more on bringing the right materials, allocating them to the right persons and managing them well.

5. Recommendations

This paper has given a brief summary of materials management practices on construction projects, how effective use of materials can result to a project success. it is openly vital to manage all materials efficiently. Poor management of construction materials disturbs the whole piece of construction projects in terms of time, cost, value and output. The wastage of materials should also be reduced through construction in order to escape loss of profit for construction companies. There is a need to grow new methods to materials management in construction project in order to increase the worth of the production method.

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